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ABSTRACT

According to a survey report of the Student Guidance Center at the Seoul National University, approximately thirty percent of the freshmen expressed the desire to be transferred to other departments. It was further reported that more than forty percent of them list the unsuitability of their academic departments to their interests and aptitudes as the reason for their desire to transfer. The present investigation of the structure of aptitudes should provide basic information necessary for effective educational and vocational guidance for the students and for policy making on the part of the university administration. This research purports to develop principles and strategies for the selection, placement, and guidance of freshmen. Specifically, the major purposes are, first, to examine the validity of aptitude tests for the selection of freshmen and second, to identify the relationships between the aptitude structures and the placement of freshmen. In addition, the study has the corollary purpose of determining the effectiveness of the Differential Aptitude Test. (Author/BW)

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A STUDY ON THE APTITUDE STRUCTURES OF FRESHMEN IN SEOUL NATIONAL UNIVERSITY

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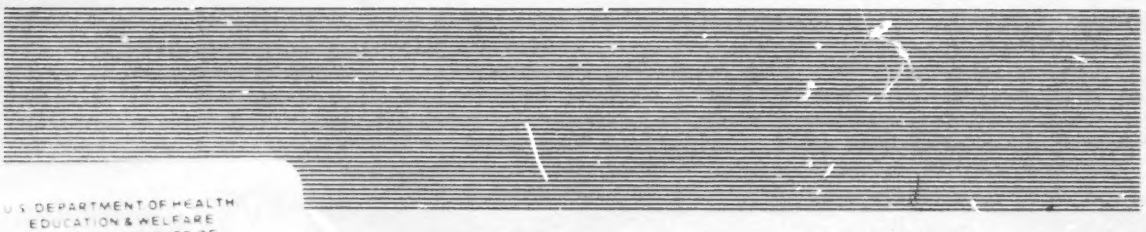

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A STUDY ON THE APTITUDE STRUCTURES OF FRESHMEN IN SEOUL NATIONAL UNIVERSITY

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Korean Institute for Research in the Behavioral Sciences

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PREFACE

This is the final report of the research "A study on the aptitude structures of Freshmen in Seoul National University" initiated in November, 1969 by means of a Trust Fund grant approved under the agreement among the United States Agency for International Development, the Ministry of Science and Technology, and the Ministry of Education of Republic of Korea.

The purpose of the present study is to analyze the structure of aptitudes of Seoul National University Freshmen and to examine whether or not the students were properly placed in their respective departments, thus to provide basic information and data upon which to base more adequate student guidance program and policy making. In addition, the study has the corollary purpose to determine the effectiveness of the Differential Aptitude Tests.

The concept of aptitude is a comprehensive one. In addition to one's scores on a test or a test battery of aptitudes, the consideration on aptitudes must take into account the testee's environment, interests, family background, and motivation above and beyond the test scores. However, the present study limits itself to the results of the aptitude tests, therefore, this report must be interpreted with a full recognition of this limitation.

We regret that the administration of the tests had to be postponed because of campus turbulence in 1969. Accordingly, without the hard works of the assistants of the statistical staff at the Korean Institute for Research in the Behavioral Sciences, the large amount of data would not have been handled in the limited period of time.

Finally, we must say hearty thanks to the following persons and organizations; the researchers of Korean Institute for Research in the Behavioral Sciences who have given us generous advise for this study, the administrators of Seoul National University who provided us with convenience for the test administration, United States Agency for International Development which assumed the financial burden willingly, and Ministry of Education and Ministry of Science and Technology which facilitated this research by giving administrative supports.

September, 1970

Korean Institute for Research in the Behavioral Sciences

Director : Chung, Bom Mo

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APPENDIX: A. The expectancy table for academic achievements

B. The table of department classification on group

1. INTRODUCTION

A. Objectives

According to a survey report of the Student Guidance Center at the Seoul National University[1], approximately 30 per cent of the freshmen expresses the desire to be transferred to other departments or colleges, and some of this discontinue their academic pursuit. It is further reported that more than 40% of them lists, as the reasons for the desire for transference or discontinuation, the unsuitability of the academic departments to their interests and aptitudes. They variously express dissatisfactions with their departments and consequently lag behind in academic achievement.

From the standpoint of the individual students, these results would indicate that prior to selecting a major field, the students had had limited knowledge about the academic departments they are currently majoring in. From the point of view of the high schools they come from, the results should suggest that the college preparatory education was overemphasized at the cost of the guidance programs which are supposed to take into acount the potential ability and aptitudes of each student.

Research indicates that the degree of motivation towards academic performance is closely related to whether or not the student is placed in an academic department in accordance with his aptitudes. Therefore, in order to place them in the proper academic departments, to make available effective educational and vocational guidance program to the students, and to enhance their academic motivation and achievement, it is imperative to maintain some data on the structure of aptitudes of each student. Subsequent to the expansion of the Division of General Education at the Seoul National University, the students will be selected by the fields of specialization rather than by the colleges which are classified adminstratively[2].

In response to the necessity for a close examination of the adequacy and rationale of this system, the investigation of the structure of aptitudes should provide basic information necessary for effective educational and vocational guidance for the students and for policy making on the part of the university administration.

This research purports to develop principles and stratigies for the selection, placement, and guidance of freshmen at the Seoul National University. Specifically, the major purposes of the present research are, first, to examine the validity of the aptitude tests for the selection of freshmen and second, to identify the relationships between the aptitude structures and the placements of the freshmen.

B. Contents

In order to accomplish the aforementioned objectives, Differential Aptitude Test, a comprehensive aptitude battery, developed by the Korean Institute for Research in the Behavioral Sciences was administered and the resultant data were analyzed to provide the following information :

1) Student Guidance Center, Research Review: Studies on the problems of Seoul National University students, Seoul National University, Vol. 5, No. 2. 1968.

2) The term "fields of speicialization" meam the group which are classified the departments of colleges courses in term of their curriculum and aptitude structures. "Fields of specialization" will be substituted for the "Groud" in the text.

1. **An analysis of the correlation between the scores on the college entrance examination and the composite scores on the aptitude tests by field of specializations.**

By analysing the correlations between the entrance examination scores and the composite aptitude tests scores, the validity of the aptitude structures, previously analyzed and studied in various theoretical and experimental studies, will be examined.

2. **Comprehensive analysis of the test results.**

By analysing the aptitude tests results of entire freshmen of Seoul National University and of groups, tentative norms for freshmen will be established and compared with the norms of Korean college students.

3. **Analysis of the aptitude structures of each group and of the entire freshmen.**

By analysing the aptitude structures of the entire freshmen and of groups, the position and level of aptitudes on their own groups will be investigated.

4. **Analysis of the aptitude structures of those who are mis-placed and those who are properly-placed.**

By analysing the aptitude structures of individual in terms of department and of group, the adequacy of department or group selection of students will be examined. The mis-placed and properly-placed students will be studied in terms of how their aptitudes are relevant to other group.

5. **Development of the expectancy table for academic achievements according to the aptitude structures.**

A tentative form of expectancy table for academic achievements will be developed according to each aptitude structure. The degree of academic achievements of each student can be predicted by the use of the results of aptitude test and the expectancy table developed therefrom.

Ⅱ. BASIC PREMISES OF RESEARCH

A. Description of the Differential Aptitude Test (DAT)

1. Nature and composition of the tests

General Intelligence Test and Differential Aptitude Test(DAT) were used for this research. These were constructed and standardized at Korean Institute for Research in the Behavioral Sciences (KIRBS) in 1968. The tests were constructed (1) to predict the degree to which each student will work effectively in the work of their choice and (2) to provide information on how the graduating high school students and their equivalents will effectively adjust to their new university academic departments or to various job conditions of not entering the university education.

The DAT battery consists of 7 sub-tests and is so designed as to measure independent ability factors and basic abilities required for various jobs in the world of works or in the courses of study at the university.

The sub-tests are as follow :

1) General Intelligence Test : Level-II-A (G)

2) Differential Aptitude Test : Level-II-A

a. Vocabulary test (V)
b. Numerical 〃 (N)
c. Spatial 〃 (S)
d. Perceptual 〃 (P)
e. Mechanical aptitude (Me)
f. Manual test (Ma)
g. Reasoning test (R)

2. Statistics of the tests

1) Reliability

The reliability of each sub-test is obtained using different methods of odd-even (G, V, N, S, Me, and R tests) and pre-pro (P and Ma tests) split-half, which was then corrected by Spearman-Brown Fomular.

<Table 2-1> Reliability

Test	N	M (raw score)	SD	Reliability
General Intellgince test	260	42.84	7.16	.849
Vocabulary 〃	260	29.13	3.55	.729
Numerical 〃	260	21.81	2.69	.708
Spatial 〃	260	26.18	5.44	.716
Perceptual 〃	260	①46.13 ②12.01	①11.23 ② 3.68	①.949 ②.841
Mechanical Aptitude	260	12.63	3.38	.594
Manual 〃	260	①21.84 ①72.25	①10.18 ②15.64	①.923 ②.942
Reasoning 〃	260	14.83	2.64	.588

Date of testing:1970. 3.4(~10

2) Validity

<Table 2-2> Intercorrelation N=510

	1	2	3	4	5	6	7	8	M	SD
1. G		.47	.37	.23	.29	.25	.20	.35	129.29	12.50
2. V			.18	.19	.12	.24	.09	.27	59.34	6.27
3. N				.23	.24	.06	.11	.35	64.33	5.89
4. S					.22	.43	.20	.38	59.23	8.80
5. P						.17	.11	.15	51.67	6.78
6. Me							.09	.26	62.41	9.41
7. Ma								.12	47.85	7.82
8. R									58.13	8.55

Concurrent Validity

<Table 2-3> Correlation coefficients between the scores on DAT and the scores on the college entrance examination N=233

	Korean Language	English	Mathematics	Social Study	Science	Choiced Subject	Total score	M	SD
G	★★.26	★★.21	★★.19	★.14	★.19	.09	★★.29	129.29	12.50
V	★★.37	★★.28	—.00	★★.30	★.20	.06	★★.26	59.34	6.27
N	.11	★.17	★★.32	—.02	.11	—.07	.13	66.33	5.89
S	★.17	.04	★★.18	.11	★.15	—.11	★.16	59.23	8.80
P	.11	.09	★.15	.08	★.15	.06	★.17	51.57	6.78
Me	.11	—.01	★★.29	.10	.06	—.21	.13	62.41	9.41
Ma	★.14	—.06	.12	—.05	★.15	—.09	.07	47.85	7.82
R	.07	.07	★★.35	.12	.12	—.05	—.133	58.13	8.55

★★ 1% level of significance
★ 5% level of significance

<Table 2-4> Correlation coefficients between the scores on DAT and the scores on the college entrance preliminary examination N=233

Test	Korean Language	English	Mathematics	Social Study	Science	Choiced Subject	Total score
G	★★.18	★.15	★★.17	.11	★★.21	.09	★★.20
V	★★.34	★★.31	.10	★.34	★.14	.05	★★.22
N	.03	★.32	★★.33	.01	★.15	.11	.12
S	.02	.13	.★17	—.02	★★.25	.11	—.08
P	—.02	.02	—.08	.02	.13	★.14	.08
Me	.02	.06	.06	.03	★★.23	.02	★★.21
Ma	—.01	.08	.00	.08	★★.18	.11	.11
R	.02	.02	★★.25	.03	★★.23	★.15	★.16

★★ 1% level of significance
★ 5% level of significance

<Table 2-5> Correlation coefficients between the scores on the college entrance examination and the scores on DAT of group [3]

Group	N	r
Linguistics & Literature	88	★★ .343
Humanities	80	★★ .434
Social Sciences	124	★★ .339
Natural Sciences	112	★★ .298
Home Economies	128	★★ .408
Engineering	151	★★ .556
Medical Sciences	90	★★ .508
Pharmacy	77	★★ .291
Nursing	78	★★ .460
Agricalture & Forestry	113	★★ .401
Marine & Fishery	26	★★ .455
Education	153	★★ .301

★★ 1% level of sigcificance

3) Multiple correlation

Multiple correlation coefficients, taking each sub-test as independent variables and criterion measures such as dependent variables, were calculated by the use of Doolittle procedures. (β and B coefficients obtained in the computing process are omitted.)

(Table 2-6) Multiple prediction of college entrance examination scores by all the tests

M	SD	Cofficient / Criterion	Multipe Correlation Coefficent	Multipe Correlation Variance	Standard Error of Estimate
41.75	8.67	Korean Language	★★ .511	.261	7.454
30.18	12.14	English	★★ .455	.207	10.813
33.85	17.60	Mathematics	★★ .808	.652	10.366
48.94	7.98	Social Study	★★ .364	.132	7.428
42.91	9.75	Science	★★ .329	.108	9.207
220.03	43.40	Total score	★★ .604	.364	34.587

(Table 2-7) Multiple prediction of college entrance prelliminary examination scores by all the tests

M	SD	Coefficient / Criteria	Multiple Correlation Coefficient	Multiple Correlation Variance	Standard Error of Estimate
36.31	4.46	Korean Language	★ .287	.082	4.273
35.88	7.59	English	★★ .388	.150	6.992
36.32	8.87	Mathematics	★★ .469	.219	7.830
30.96	4.80	Social Study	.134	.017	4.755
36.91	5.67	Science	★ .288	.082	5.425
		Total score	★★ .748	.559	18.088

★★ 1% Level of significance
★ 5% Level of significance

(Table 2-8) Multiple prediction of college entrance examination scores by college entrance preliminary examination scores and all the tests

Coefficient / Crieteria	Multiple Correlation Coefficient	Multiple Correlation Variance	Standard Error of Estimate
Korean Language	★★ .714	.509	6.073
English	★★ .675	.455	8.960
Mathematics	★★ .862	.742	8.931
Social Study	★★ .698	.487	5.714
Science	★★ .497	.246	8.481
Total score	★★ .906	.821	18.333

★★ 1% Level of significance

3) It is obtained by calculating a correlation between entrance examination scores and a composite scores according to the aptitude structures of each group.

4) Item analysis

Item difficulty and discriminating power of each sub-test were obtained by reading the Fan's Item Analysis Table.

(Table 2-9) Item difficulty distribution

	G	V	N	S Part1	S Part2	Me	R
.90-	13	13	17	3		1	4
.80-	12	4	7	10	2	2	6
.70-	12	8	2	3	2	5	3
.60-	10	6	2	4	3	2	1
.50-	7	3	2	4	1	5	4
.40-	3	2		2	2	1	2
.30-	2	2		1	2	6	
.20-	1	1		1		1	
.10-		1				1	
average	.74	.73	.87	.71	.61	.56	.75
Number of Item	60	40	30	28	12	24	20

(Table 2-10) Item discrimination distribution

	G	V	N	S Part1	S Part2	Me	R
.70-	1						
.60-	4			1	1		
.50-	5		1		3	1	1
.40-	3	3	7		3	3	3
.30-	11	5	6	6		9	8
.20-	12	10	6	11	2	7	1
.10-	11	14	5	7	1	3	1
.00-	13	8	5	3		1	1
average	.28	.20	.28	.24	.45	.31	.32
Number of Item	60	40	30	28	12	24	20

B. Selection and Classification of Group

The selection and classification of the groups are based on the group classification system given in the Statistic Year Book of Education. [4] Fifteen groups represent nearly all the departments of Korean universities. The system considers the characteristics of curriculum and the results of a theoretical review and experimental analysis for the each group's aptitude structures. The classified and selected groups* are as follow.

① Lingistics & Literature
② Humanities
③ Social Sciences
④ Natural Sciences
⑤ Home Economics
⑥ Engineering
⑦ Medical Sciences
⑧ Pharmacy
⑨ Nursing
⑩ Agriculture and Forestry
⑪ Marine and Fishery
⑫ Education
⑬ Arts
⑭ Physical education
⑮ Flying

C. Aptitude Structures

The grouping of college courses in terms of their curriculum characteristics and the aptitude structures were already completed in one of the KIRBS' studies in 1969 [5]. The subtests of the aptitude tests battery also have been assigned differing predicative weights, i.e., the coefficients, which were obtained through Multiple correlation coefficient calculation, on each group.

The standard aptitude scores are established on the basis of following assumptions:

4) Ministry of Education, Statistic Year Book of Education Republic of Korea, 1969.
* Presentation of departments according to groups are omitted.
5) Korean Institute for Research in the Behavioral Sciences, Technical Report: The Differential Aptitude Tests and General Intelligence Tests, 1970.

1. The higher score one obtains on the aptitude tests, the higher the academic achievement one is likely to accomplish.
2. The higher composite score on the aptitude tests one obtains, the higher aptitude one is likely to have.

The standard aptitude scores were derived by the use of linear combination method, one of the methods of personnel selection proposed by Thorndike.[6] In this process, the standard aptitude scores[7] have been adjusted through several times of trail-and-error procedures with the criterion of the students records in college major subjects, and adopted the composits score pertaining to Q_1 obtained by Quartile deviation method.

The standard scores obtained by this method allow it's standard error of measurement within δ-1 and the scores pertaining to -1δ are regarded as optimum standard scores. It means that the student whose score is above the standard score belongs to somewhere within 84% in his college course group. The aptitude structures and standard aptitude scores for the group are as follows :

Table 2—11

(Table 2-11) Aptitude Structure & Optimum Standard Score

G / IQ	V	N	S	P	Me	Ma	R	Optimum Standared Score	
Literature Linguistics	1.5							/2.5	54
Humanities		.5						/2.5	55
Social Sciences								/3	56
Natural Sciences					.5		1.5	/5	55
Home Economics			.5	.5				/4	55
	.5		1.5		1.5		1.5	/6	55
Medical Sciences				1.5			1.5	/6.5	54
Pharmacy								/4	55
Nursing		.5	.5					/4	52
Agriculture & Forestry	.5	.5			.5			/3.5	53
Marint & Fishery			1.5					/4.5	53
Education			.5					/4	54
Arts						2.0		/5.5	50
Physical Education	.5	.5					.5	/3.5	46
Flying			1.5		1.5			/7	54
Antitude for General College Entrance	1.5							/3.5	52

6) R. L. Thorndike. Personnel selection; test and measurement techniques, New York, John wiley & Sons. Inc., 1949, P. 185.

* Thorndike has devised four different methods for personnel selection:
1. Linear combination method. 2. Non-linear function method.
3. Multiple cutoff method. 4. Clinical method.

7) In this study, the limited time and manpower forced us to consider only test results in the analysis of aptitude structure. In the statistical treatment, non-linear fuction method, Multiple cutoff method & Clinical method were not used because of limited time and manpower. Therefore, it should be recognized that the establish standard aptitude scores are not absolute one.

Ⅲ. METHOD AND PROCEDURE OF RESEARCH

A. Instruments [8]

1. General Intelligence Test
2. Differential Aptitude Test
   - a. Vocabulary test
   - b. Numberical 〃
   - c. Spatical 〃
   - d. Perceptual 〃
   - e. Mechanical aptitude
   - f. Manual Test
   - g. Reasoning 〃

B. Subjects

Subjects were the entire student population in the Division of General Education with the exclusion of Arts and Physical Education groups. The departments of the colleges of Music and of Fine Arts and the department of Physical Education of College of Education were considered inadequate for this study because they are somewhat heterogeneous in their curriculum contents and student selection methods. In addition, it is difficult to measure their aptitudes and to identify their aptitude structures by means of GIT and DAT.

The sample sizes by Depts., Colleges and Groups are as follow :

<Table 3-1> Sample sizes by Depts., and Colleges

College of Engineering

Department	Regular Number	Sampling Number
Textile engineering	60	52
Chemical	60	55
Civil	40	37
Architectural	40	37
Electrical	80	70
Mechanical	50	48
Electronic	50	46
Naval architecture	20	17
Flying	20	16
Resourses	30	27
Metallurgical	60	53
Nuclear Engineering	30	27
Education	120	102
Applied mathematics	30	27
〃 chemistry	30	26
〃 physics	30	17
Medical products	30	26
Material	30	22
Total	800	705

College of Agriculture

Department	Regular Number	Sampling Number
Agriculture	20	21
Forestry	20	18
Sericulture	30	27
Agricultural chemistry	20	18
〃 economics	20	17
〃 home economics	20	20
Zootechnology	25	23
Veterinary medicine	40	32
Agriculture education	20	20
Horticulture	10	10
Food engineering	20	20
Forest product processing	15	14
Agricultural biology	20	17
〃 Engineering	40	35
Total	320	292

8) In this research, GIT and DAT are used as basic tools for the prediction of academic achievements or the identification of aptitude structures. A more detailed information may be found in the Technical Report: The differential Aptitude Tests and General Intelligence Tests reported by KIRBS in 1970, 7.

College of Law

Department	Regular Number	Sampling Number
Law	100	92
Public administration	60	50
Total	160	142

College of Liberal Arts and Sciences

Department	Regula number	Sampling Number
Korean Linguistics and literature	20	15
Chinese 〃	10	9
English 〃	20	17
French 〃	20	19
German 〃	20	18
Linguistics	10	10
Oriental history	10	9
Western 〃	10	10
Philosophy	30	26
History	15	11
Anthropology	10	6
Geography	20	18
Sociology	20	18
Political science	20	17
Diplomatic science	20	20
Psychology	10	10
Social work	10	7
Mathematics	20	18
Physics	30	27
Botany	15	14
Geology	20	19
Astrometeorology	20	17
Zoology	15	15
Marine	30	26
Chemistry	30	25
Microbiology	20	19
Pre-medicine	160	51
Pre-dentistry	100	40
Total	735	511

College of Commerce

Department	Regular Number	Sampling Number
Economics	55	42
Business management	100	87
International trade	40	36
Total	195	165

College of Medicine

Department	Regular Number	Sampling Number
Nursing	80	78

College of Pharmacy

Department	Regular Number	Sampling Number
Pharmacy	40	40
Pharmaceutics	40	37
Total	80	77

College of Home Economics

Department	Regular Number	Sampling Number
Home administration	30	29
Food and nutrition	30	30
Clothing	30	29
Total	90	88

College of Education

Department	Regular Number	Sampling Number
Physics education	30	27
Chemistry 〃	30	22
Biology 〃	20	13
Earth 〃	30	38
Social study 〃	20	32
History 〃	20	11
Geography 〃	30	19
English language	40	39
German 〃 〃	20	18
French 〃 〃	20	17
Education	20	20
Mathematics 〃	40	39
Korean language 〃	40	34
Total	360	329

<Table 3-2> Sample Size by Groups

Group	Regular	Sampling	Remarks
Linguistics & Literature[8]	100	88	
Humanities	90	80	
Social Sciences	475	416	
Natural Sciences	290	259	
Home Economic	130	128	
Engineering	640	568	
Medical sciences	300	123	
Phamacy	80	77	
Nursing	80	78	
Agriculture & Forestry	120	113	
Marine & Fishery	30	26	
Education	480	431	
Total	2,615	2,387	84.8%

C. Criteria

The scores on the College Entrance Preliminary Examination and College Entrance Examination were used as the criteria against which to validate the aptitude test. Such criteria are chosen through a close examination by the subject matter specialists. The test scores have been also generally regarded as one of the most reliable and objective criteria.

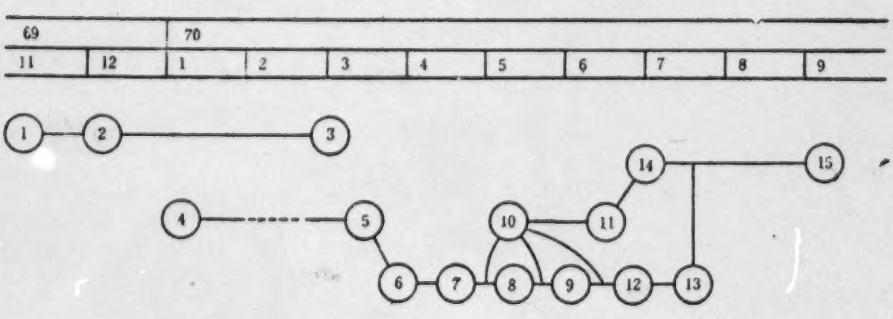
D. The Procedures and Methods of Tests Administration

Tests were administrated by the students of College of Education, SNU, who have taken seven days of intensive training courses on test administration. The total time necessary for the test administration was approximately 2 hours(2 P.M.~4 P.M.)

The subtests were given in the following order; General intelligence test, Vocabulary, Numerical, Spatial, Perceptual, Mechanical aptitude, Reasoning and Manual test. Following four subtests were completed, a period of 10 minutes were given to the students for rest.

E. Research Process PERT

Rescrch Progress PERT.



8) The departments relevant to each group refer to Appendix 2: the table of department classification on group.

1. Set up of research objectives and contents
2. Validation study of test, theoretical and experimental study on the aptitude structures of each group
3. Completion of 2
4. Test print (GIT & DAT)
5. Test administration
6. Treatment of test results (scoring, framing of the lists)
7. Calculation of correlations between tests and college entrance examination
8. Analysis of aptitude structures of the whole students
9. Analysis of aptitude structures of the mis-placed students.
10. Interpretation of 7, 8, 9 results
11. Completion of 10
12. Norm construction of each group
13. Contruction of expectancy table for academic achievements
14. Report writing
15. Printing

Ⅳ. RESULTS AND INTERPRETATION

A. Overall Analysis of the Test Results

1. General status analysis

<Table 4-1> General status analysis

Tests	SNU Freshmen Group					Norm Group		
	N	raw score M	raw score SD	IQ. Tscore M	IQ. Tscore SD	N	M	SD
G	2,387	★★	42.82	5.70	128.30	12.07	632	29.0[illegible]	7.56
V	2,387	★★	28.90	3.19	59.29	5.77	588	25.58	5.44
N	2,387	★★	22.94	3.13	63.96	5.84	593	16.86	5.27
S	2,387	★★	27.67	5.17	59.30	8.66	587	21.92	6.12
P	2,387	★ — ① ★★ — ②	44.76 11.90	① ②	9.50 4.06	51.22	6.66	607	①45.77 ②10.33	①10.29 ② 4.90
Me	2,387	★★	13.68	2.97	62.30	4.08	596	9.42		3.43
Ma	2,387	★★ — ① ★★ — ②	22.58 73.08	① ②	9.48 14.01	48.33	7.32	586	①24.70 ②75.55	①10.22 [illegible]13.00
R	2,387	★★	14.16	2.82	58.76	8.03	582	11.62		4.00

★★ 1% Level of significance
★ 5% Level of significance

Seoul National University students show significantly higher level of performance on each of the aptitude subtests than do the average college students in the nation. More (→Page-14)

<Table 4-2> Status analysis on each group

IQ. TEST Score

Tests \ Groups / Statistics		A	B	C	D_1	D_2	E	F_1	F_2	F_3	G	H	I
G	M	131.17	129.2	133	131.12	120.12	131.4	129.95	126.58	122.84	125.49	125	124.76
	SD	11.2	13.61	10.62	11.67	11.4	11.71	11.71	12.83	13.38	13.84	10.91	12.95
V	M	60.4	61.1	61.79	59.16	59.13	60.27	57.6	57.84	58.17	58.3	58.92	58.55
	SD	5.14	4.71	5.4	6.7	5.8	6.26	6.54	5.61	4.59	6.07	5.84	6.38
N	M	63.52	64.55	57.76	65.46	62.84	65.77	64.78	64.34	60.49	62.12	64.77	63.07
	SD	6.11	5.40	4.84	5.4	6.07	4.88	5.82	5.43	9.19	7.05	3.77	6.12
S	M	58.13	59.2	59.02	61.54	60.23	61.07	55.27	59.1	59.99	59.32	59.77	59.55
	SD	9.76	8.8	9.56	8.7	8.37	8.12	8.99	6.90	8.23	9.06	9.08	9.04
P	M	51.43	52.66	53.3	52.05	53.91	51.24	54.76	48.87	55.3	51.98	49.62	51.49
	SD	5.53	6.70	6.61	7.5	6.67	8.03	5.56	6.97	5.82	6.18	5.94	7.48

		A	B	C	D_1	D_2	E	F_1	F_2	F_3	G	H	I
Me	M	61.44	63	61.49	66.42	59.27	16.42	58.63	62.75	57.37	63.52	65.8	61.48
	SD	7.89	8.73	8.62	8.73	8.45	8.85	8.5	8.44	6.84	9.29	7.0	9.26
Ma	M	48.8	47.34	48.25	48.75	48.20	47.68	48.22	46.9	56.46	47.66	42 88	48 83
	SD	8.87	9.02	6.79	6.75	6.78	7.39	7.65	6.63	7.17	7.01	6.77	6.98
R	M	58.27	57.55	60.19	60.07	60.34	60.67	56.41	57.45	67.88	58.05	57.19	57.05
	SD	8.44	7.47	8.28	7.63	7.45	7.93	9.95	8.37	6.64	10.28	5.97	7.89
N													

raw score

		A	B	C	D_1	D_2	E	F_1	F_2	F_3	G	H	I	Norm Group
G	M	44.19	43.21	45.08	44.18	43.23	44.28	43.67	41.95	40.28	41.48	41.23	41.11	29.02
	SD	5.38	6.37	5.03	5.65	5.48	5.57	5.55	6.03	5.82	6.09	5.18	6.09	7.56
V	M	29.56	29.96	30.31	28 93	28 84	29.54	27.97	28.16	28.31	28.48	28.73	28.53	24.58
	SD	2.81	2.54	2.99	3 61	3.15	3.02	3.7	3.08	2.53	3.31	3.17	3.47	5.44
N	M	22.76	22.94	23.88	23.73	22 42	23.80	23.39	23.17	21.69	32.06	23.38	22.07	16.86
	SD	3.06	3.71	2 4	2.73	3.04	2.44	3.58	2 71	3.08	3.52	1.88	5.48	5.27
S	M	27.18	27.55	27.68	29.03	28.2	28.73	25.14	27.57	28.08	27.63	28.12	27.17	21.92
	SD	5.35	5.42	5.28	5.37	5.12	4.96	5.55	4 21	5.04	5.56	4 74	5.47	6.12
P	M	①45.16	47.06	47.97	46.01	48.98	47.27	56.16	41.41	51.82	45.48	42 58	44.7	①45.77
		②11.83	12.63	12 27	12 01	12.34	10.61	12 71	11.03	12.86	12.08	11 38	12.06	②10.29
	SD	① 8.93	9.45	9.02	11.16	9.6	12.42	9.61	10.08	9.36	9.47	8 32	11.11	①10 33
		② 3.44	6 2	3.82	3.99	3.71	3.87	4 02	4.09	3.5	3.93	3.80	4.21	② 4.90
Me	M	13.35	13.95	13.4	15.18	12.62	15.14	12.38	13.83	11.92	14.11	14.88	13.37	9.42
	SD	2.77	3.14	3.11	3 21	3 03	3.19	2.97	2.94	2.41	3.14	2 45	3.34	3.43
Ma	M	①21.74	18.54	21.98	22 88	23.48	22.27	23 49	21.62	31 36	22.84	18 27	22 46	①24 70
		②76.43	76.37	72 63	73.36	71.99	71.42	70 48	71 04	83.99	70.58	64 42	74.23	②75.55
	SD	① 8.53	9.55	10.03	9.49	8 9	10 06	10 6	9.63	9.64	9.12	8 84	9.25	①10.22
		②20.36	19.01	15.83	12 1	10.03	13.86	14 91	9.59	12.47	14.21	10.97	14.79	②13.00
R	M	14.09	13.85	13.59	14.69	14 78	14.9	13 47	13.82	13.95	14 02	13.73	13.64	11.62
	SD	2.81	2.49	4 8	2.54	2.48	2.54	3.32	2.79	2.21	3.07	1.99	2 82	4.60
N		88	80	416	259	128	568	123	77	78	113	26	431	

A. Linguistics & Literature
B. Humanities
C. Social Sciences
D_1. Natural Sciences
D_2. Home Economics
E. Engineering
F_1. Medical Sciences
F_2. Pharmacy
F_3. Nursing
G. Agriculture & Forestry
H. Marine & fishery
I. Education

specifically, in the General Intelligence, Numerical and Spatial tests the difference is large, while in the Manual and Perceptual tests the difference is relatively small. SNU students have high intellectual capacity, but make approximately the same or lower scores on various tests of psychomotor ability than the average score obtained by college students in the nation.

2. Status analysis on each group

According to the above statistics, G, V, N, S, and R tests, belonging to the intellectual ability dimension, are significantly high for each group as compared with national college students. In P test representing the psychomotor dimension, a non-significant difference was found and in M test, SNU students showed the same or lower performance compared with national college students.

A more detailed analysis will be given in the fellowing :

The high performance group in

General intelligence—Social Sciences, Engineering, Linguistics & Literature, and Natural Sciences

Verbal ability —Humanities, Social Sciences, Linguistics & Literature and Engineering

Numerical ability —Engineering, Social Sciences, Natural Sciences and Medical Sciences

Spatial ability —Natural Sciences, Engineering and Home Economics

Perceptual ability —Nurse, Medical Sciences and Home Economics

Mechanical aptitude—Engineering, Natural Sciences and Marine & Fishery

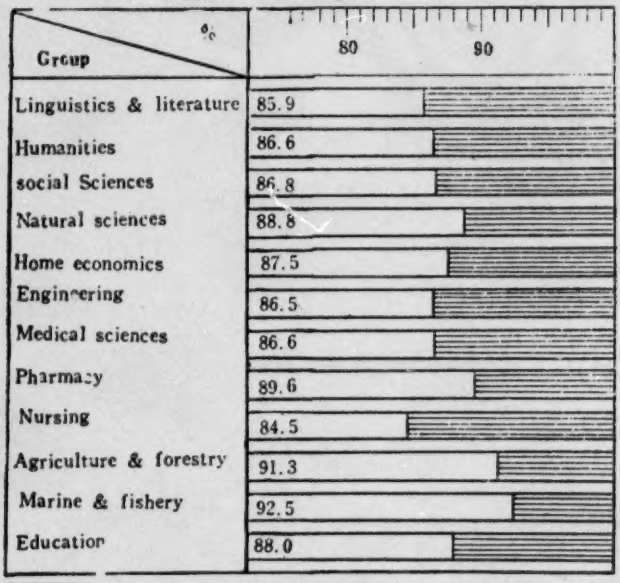
Manual dexterity —Nursing

Reasoning ability —Engineering, Natural Sciences, Social Sciences and Home Economics

In analysis of the above results in relation to the aptitude structures, the tests which form the aptitude structures of the groups, show mostly a high average score. The standard deviations of each test which form the aptitude structures of each group show less than that of other tests. This indicates that the aptitude structures of each group identified through the validation study of DAT are logically sound.

(Table 4-3)

The Level of Aptitude on Groups of Freshmen N=2,387



B. Analysis of Aptitude Structure of Freshman

Table 4—3 shows the results of the overall analysis of aptitudes of the entire freshmen group. The results show that more than 83.9 % of the fresmen seem to have aptitudes that fit to study any field of specializations classified whole groups. More than 90% of the students fit the Agriculture & Forestry and Marine & Fishery.[9] The aptitudes of the entire freshmen

9) The term, the departments of Literature means the groups belonging to a literary course as Linguistics & Literature, Humanities, Social Sciences and Education etc. The departments of Physical Sciences means the groups belonging to a Natural Sciences, Engineering, Medical Sciences, Agriculture & Forestry and Marin and Fishery etc.

group relevant to the departments of Literature and Physical sciences are found to be approximately the same.

C. Analysis of the Aptitude Structure of Each Group

1) Analysis of the aptitude structure on their own groups

1. Linguistics and Literature

(Table 4-4-1)

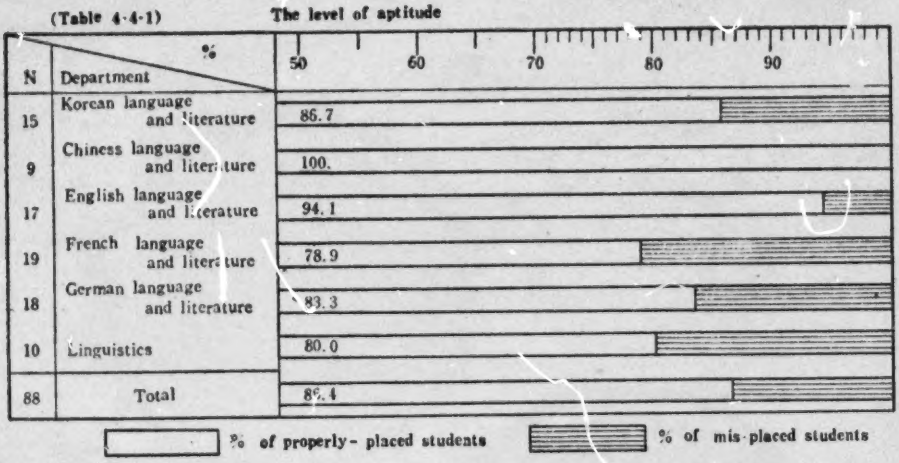
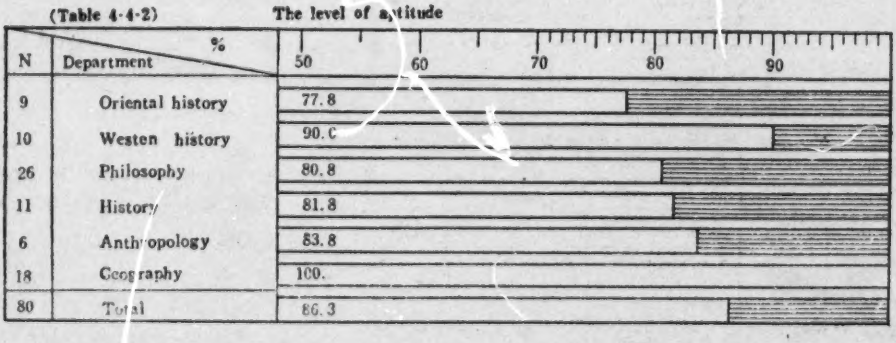


Table 4-4-1 shows the pattern of aptitudes of freshmen belonging to Linguistics and literature group. It is shown that more than 86.4% of the students in this group have aptitudes which fit their own specialization. Especially, the entire students of the entire department of Chinese Language & Literature are found to be properly placed in terms of these aptitudes. Various departments of Language and Literature in which the properly-placed students are more than 90% are the departments of Chinese, of English, and of Korean Language & Literature. The departments where the largest number of mis-placed students is that of French, the percentage being 21.

2. Humanities

(Table 4-4-2)



1) In this research, the term of a properly-placed students are defined as those who have aptitudes that fit the field of their own specialization. The mis-placed students are those who have aptitudes that do not fit the field of their own specialization.

Table 4—4—2 reveals that more than 86.3% of the students of Humanities group also have aptitudes relevant to their own specilization. The entire students of the department of Georaphy appear to be properly-placed.

The departments which have the properly-placed students of 90% or more are only Western History and Georaphy. The department where the largest number of mis-placed students is that of Oriental History with 22.2%.

3. Social Science

(Table 4-4-3)

The level of aptitude

N	Department	%
20	Education	70.
20	Diplomatic science	100.
18	Sociology	94.4
7	Social work	57.1
10	Psychologe	90.
87	Business management	92.
42	Economies	100.
92	Law	96.
17	Agriculture management	82.4
50	Public administration	92.
26	International trade	92.
17	Political science	100.
416	Total	92.5

Table 4—4—3 reveals that more than 92.5% of the students of Social sciences group have aptitudes relevant to their own specializations. Most of the students in social sciences group seem to be properly placed in their own field of specializations, except for those students in the departments of Social Works and Education. The students of the departments of Diplomatic Science, Economics and Political Science generally appear to be properly placed. The departments which suffer from the large number of mis-placed students are Social Work with 42.9% and Education with 30%.

Table 4—4—4 reveals that more than 93.4% of the students of Natural Sicences group have aptitudes relevant to their own specialization. Most of the students in Natural Sciences group seem to be properly placed in their own fields of specialization. The department where the largest number of mis-placed students is that of Agricultural biology with 17.6%

4. Natural Sciences

(Table 4-4-4) The level of aptitude

N	Department	%
18	Mathematics	94.4
27	Applied mathematics	96.3
27	Physics	96.3
19	Geology	100
17	Astrometeorology	94.1
17	Applied physics	88.2
14	Botany	92.9
15	Zoology	86.7
19	Microbiology	89.5
17	Agricultural biology	82.4
25	Chemistry	92.
26	Applied chemistry	100.
18	Agricultural chemistry	94.4
259	Total	93.4.

5. Home Economics

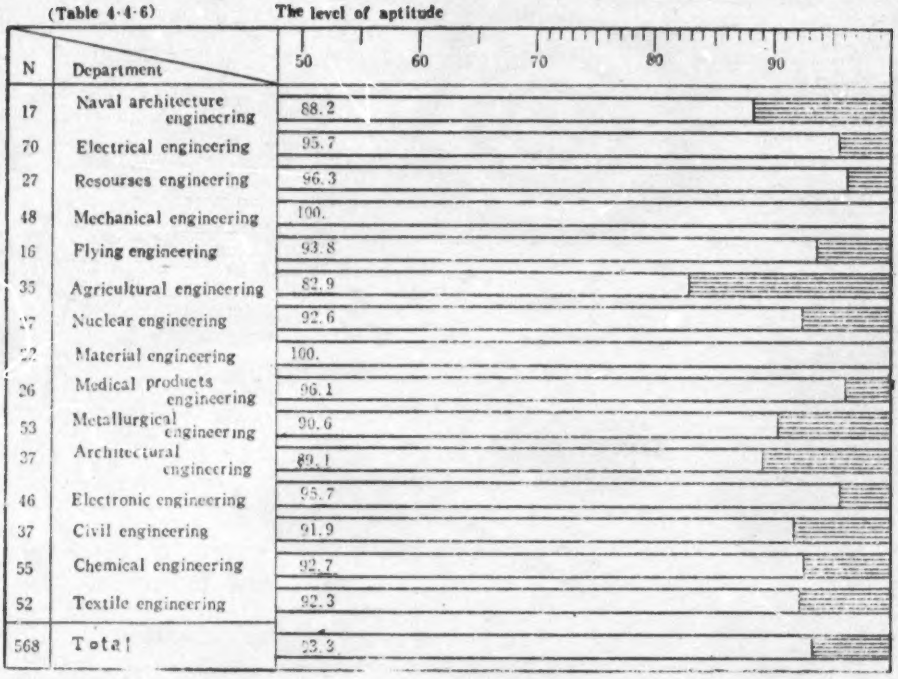
(Table 4-4-5) The level of aptitude

N	Department	%
29	Home administration	86.2
30	Food & nutrition	100.
29	Clothing	86.2
20	Agricultural home economics	65.0
20	Food engineering	95.0
128	Total	87.5

Table 4—4—5 reveals that more than 87.5% of the students of Home Economics group is found to have aptitude relevant to their own field of specializations. The deparments which enjoy the properly-placed students of 90% or more are Food & Nutrition and Food Processing. Other departments in this group do not differ from this picture. Whereas, the students of Food & Nutrition generally appear to be properly-placed, the students of Agricultural Home Economics appear to suffer from 35% of misplacement.

6. Engineering

(Table 4-4-6)

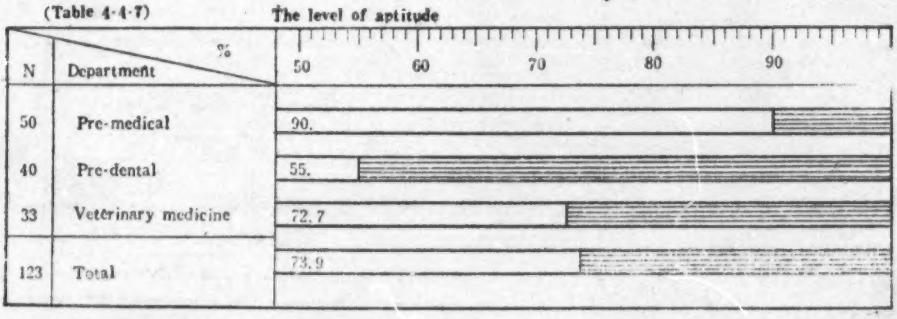


N	Department
17	Naval architecture engineering
70	Electrical engineering
27	Resourses engineering
48	Mechanical engineering
16	Flying engineering
35	Agricultural engineering
27	Nuclear engineering
22	Material engineering
26	Medical products engineering
53	Metallurgical engineering
37	Architectural engineering
46	Electronic engineering
37	Civil engineering
55	Chemical engineering
52	Textile engineering
568	Total

Table 4—4—6 indicates that more than 93.3% of the students of Engineering group have aptitudes fitting their own specializations. The departments which have the properly-placed students of 90% or more are 12 of 15 departments in this group, except for Architecture and Agricultural Engineering. The students in the departments of Mechanical and Material Engineering generally appear to be properly placed. The students in the department of Agricultural Engineering suffer the largest number of misplacement with the figure of 11.7%.

7. Medical Sciences

(Table 4-4-7)



N	Department
50	Pre-medical
40	Pre-dental
33	Veterinary medicine
123	Total

In the table 4—4—7, it is shown that more than 73.9% of the students of Medical Sciences group have fitting aptitudes while 26% appear to be misplaced. The department of Medicine is the only department where the properly-placed students of 90% or more are found. The department which have the larger number of misplaced students are Veterinary Medicine with 27.3% and Dentistry with 45%.

8. Pharmacy
(Table 4-4-8)

N	Department	%	The level of aptitude 50 60 70 80 90
40	Phamacy		92.5
37	Pharmaceutics		83.8
77	Total		88.3

In the table 4—4—8, more than 88.3% of the students of Pharmacy group have a significantly high aptitude relevant to their own specializations. The percentage of the properly-placed students of Pharmacy and Pharmaceutics are 92.5% and 83% respectively.

9. Nursing
(Table 4-4-9)

N	Department	%	The level of aptitude 50 60 70 80 90
78	Nursing		96.2

Table 4—4—9, shows that more than 96.2% of the students of Nursing group have aptitudes fitting to their own speicializations.

10. Agriculture and Forestry
(Table 4-4-10)

	Department	%	The level of aptitude 50 60 70 80 90
21	Agriculture		90.5
23	Zootechnology		95.7
27	Sericulture		88.9
18	Forestry		77.8
10	Horticulture		90.0
14	Forest product processing		85.7
113	Total		88.5

The table 4—4—10 indicates that more than 88.5% of the students of Agriculture & Forestry group have aptitudes relevant to their own specializations. The departments which enjoy the properly-placed students of 90% or more are Agriculture, Horticulture and Zootechnology. The department where the largest number of mis-placed students is that of Forestry, the percentage being 22.

11. Marine and Fishery

(Table 4-4-11)

N	Department	%	The level of aptitude 50 60 70 80 90
26	Marine		88.5

According to the table 4—4—11, more than 88.5% of the students of Marine & Fishery group have aptitudes relevant to their own specializations. The mis-placed students are 11.5%.

12. Education

(Table 4-4-12)

N	Department	%	The level of aptitude 50 60 70 80 90
32	Social study education		90.6
11	History study education		72.7
19	Geography study education		84.2
39	English language study education		95.
18	German language study education		94.4
17	French language study education		88.2
34	Korean language study education		92.3
27	Physics study education		74.
22	Chemistry study education		100.
13	Biology study education		76.9
38	Earth study education		92.1
39	Mathematical study education		87.4
102	Engineering study education		94.1
20	Agricultural study education		70.
431	Total		89.8

Finally, the table 4—4—12 shows that more than 89.3% of the students of Education group have aptitudes relevant to their own specializations. The departments which have the properly-placed students of 90% or above are Korean Language, English, German, Social Study, Geography, and Chemistry and Engineering Education. Of these the students of Chemistry Education generally appear to be more properly-placed. The departments which have many of mis-placed students are History (27.3%), Physics (26%) and Agricultural Education (30%).

2) Analysis of the aptitude structures of each group students as compared to other groups

Some students have aptitudes not only in the field of their own specializations but also in other fields of specialization. While this does not necessarily mean that these students do not fit their own specializations, some students have aptitudes which fit the other lines of specializations more than their own.

The table 4—5 shows how many students have aptitudes that are relevant to other lines of spcialization.

The students in Linguistics & Literature group have aptitudes that are relevant to other groups by more than 81.8%. The aptitudes of the students in Linguistics & Literature group relevant to other groups, except for Humanities, Natural Sciences and Marine & Fishery are higher than the aptitudes relevant to their own groups by 86.4%. More than 94.3% of the

<Table 4-5> The level of aptitude of each group students as compared to other groups(%)

Group \ N	A	B	C	D_1	D_2	E	F_1	F_2	F_3	G	H	I
Group	88	80	416	259	128	568	123	77	78	113	26	431
A	86.4	92.5	91 8	87.3	85.9	90.8	76.4	76.6	91.0	80.5	88.5	80 0
B	81.8	86 3	92.3	89.9	89.8	92 2	74.0	76 6	92 3	79.6	92.3	80.3
C	86.7	87.5	92.5	89.9	87.5	92.9	76.4	79.2	87.2	77.0	92.3	80.9
D_1	85.2	88 6	90.9	93.4	89.8	94.4	72.4	88 3	91.0	81.4	92.3	85.4
D_2					87.5				91.0			
E	87.5	85.0	85.6	92 7	83.6	93.3	68.3	93.5	88.5	82.3	92.3	80.9
F_1	88.6	88 6	90 6	89.2	87.5	91.7	73.9	79.2	88.5	81.4	88.5	80.5
F_2	88.6	90.0	92.5	92 7	91.4	94.3	77.2	88.3	93.6	80.5	92.3	84.7
F_3					80.5				96.2			
G	90.9	95.0	93.0	92.7	91.4	96 3	78 1	96 1	93.6	88.5	92.3	87.5
H	84.1	88 6	89.2	91.9	87.5	92 6	74.0	87.0	88 5	84.9	88.5	84.0
I	94.3	95.0	97.6	94 2	92 2	95.8	86 2	90.9	96.2	84.1	100.0	89.3

students in Linguistics and Literature group have aptitudes that are also relevant to Education.

Approximately 86.3% of the students in Humanities group have aptitudes that are relevant to other groups. More than 90% of the students in the Humanities group have aptitudes that are also relevant to Linguistics and Literature, Pharmacy, Agriculture & Forestry and Education.

More than 90% of the students in Social Sciences group have aptitudes relevant to other groups, except for 85.6% to Engineering group and 89.2% to Marine & Fishery group. Especially, more than 97.6% of the students in Social Sciences group have aptitudes that are also relevant to Education. But the aptitudes of the students in Social Sciences relevant to other group sare generally lower than the aptitudes relevant to their own groups by 92.5%.

More than 87.3% of the students in Natural Sciences group have aptitudes relevant to other groups. Especially, more than 92.7% of the students in Natural Sciences group have aptitudes that are also relevant to Engineering, Pharmacy and Agriculture & Forestry. But the aptitudes of the students in Natural Sciences relevant to other groups are generally lower than the aptitudes relevant to their own groups by 93.4%.

The students of Home Economics group have aptitudes relevant to other groups by more than 80.5%. The aptitudes of the students in Home Economics relevant to other groups except for Linguistic & Literature, Engineering and Nursing groups are the same or higher than that to their own groups by 87.5%. About 92.2% of the students have aptitudes that are relevant to

Education.

The students of Engineering group have aptitudes relevant to other groups by more than 90.8%. Their aptitudes relevant to Natural Sciences, Pharmacy, Agriculture & Forestry and Education is more than 94% and higher than to their own groups by 93.3%. If we divide the entire group into the departments of Literature and of Physical Sciences, we can see that the aptitudes of the students in Engineering group are more relevant to the department of Physical Sciences than to the department of Literature.

The aptitudes relevant to other groups of the students in Medical Sciences appear low as same as that to their own group (73. 9%). Of these their aptitudes relevant to Education group are the highest of the entire group by more than 86. 3%.

More than 76.6% of the students in Pharmacy group have aptitudes that are relevant to other groups. The aptitudes of the students in Pharmacy group relevant to Natural Sciences, Engineering, Medical Sciences and Agriculture & Forestry belonging to the department of Physical Sciences are higher than the aptitudes relevant to Linguistics and Literature, Humanities and Social Sciences belonging to the department of Literature. Especially, more than 96.1% of the students in Pharmacy group have aptitudes that are relevant to Agriculture & Forestry.

More than 87.2% of the students in Nursing group have aptitudes that are relevant to other groups. Especially, more than 92.3% of the students in Nursing group have aptitudes that are also relevant to Humanities, Pharmacy, Education and Agriculture & Forestry groups. But the aptitudes of the students in Nursing groups relevant to other groups are generally lower than the aptitudes relevant to their own groups by 96.2%.

Approximately 80.5% of the students in Agriculture & Forestry group have aptitudes that are relevant to other groups, except for Social Sciences by 77%. Generally, their aptitudes relevant to other groups are lower than those to their own group by 88.5%.

Approximately 88.5% of the students in Marine & Fishery group have aptitudes that are relevant to other groups. Their aptitudes relevant to other groups are higher than those to their own group by 88.5%. And their aptitudes relevant to Education group are 100%.

The students of Education group have aptitudes relevant to other groups by more than 80%. Their aptitudes are relevant to other groups, especially to Natural Sciences, Pharmacy and Agriculture & Forestry. But their aptitudes relevant to their own group are higher than those to any other groups, hence they have high aptitudes relevant to their own group by 89.2% than to other groups.

D. Analysis of the Aptitude Structure of Properly-Placed Students by Groups

<Table 4—6> The level of aptitude of properly-placed students by groups(%)

Group \ N	A	B	C	D_1	D_2	E	F_1	F_2	F_3	G	H	I
Group	76	69	385	242	112	530	91	68	75	100	23	385
A		100.0	97.6	90.9	94.6	93.2	90.1	85.3	93 3	89.0	95.7	88.1
B	89.4		98.9	94.6	99.1	94.9	91.2	86.8	94 7	89.0	100.0	89.1
C	88.1	98.6		95.0	97.3	96.0	93.4	89.7	90.7	86.0	100.0	90.4
D_1	90.8	95.7	95.3		99.1	98.1	94.5	98.5	93.3	92.0	100.0	94.0
D_2									94.7			
E	88.1	89.9	88.8	97.5	91.9		85.7	97.1	89.3	93.0	100 0	88.8
F_1	93.4	94 2	95.5	95.0	97.3	95.5		89.7	89.3	92.0	95.7	88.3
F_2	92.1	95.7	96.8	97.9	99.1	97.5	95.6		96.0	91.0	100.0	93.5
F_3					88.4							
G	93.4	97.1	96.1	97.1	97.3	99.6	85.6	100.0	94.7		100.0	95.1
H	86.8	89.9	91.4	94.6	92.9	96.2	80.0	92.6	88.0	92.0		88 6
I	97.4	100 0	100.0	97.9	99.1	98.1	97.8	100.0	96.0	94.0	100.0	

Even the students who are properly-placed in their own departments may have aptitudes that are also relevant to other fields of specialization, the table 4—6 show the results of analysis of aptitudes that the properly-placed students share with aptitudes that fit other lines of specialization.

More than 86.8% of the properly-placed students in Linguistic & Literature group have aptitudes relevant to other groups. Their aptitudes of the properly-placed students in Linguistic & Literature group relevant to other groups, except for Human Social Sciences, Engineering and Marine & Fishery are more than 90%. Especially, more than 97.4% of them have aptitudes that are relevant to Education group. The aptitudes of the properly-placed students in Linguistic & Literature group relevant to the departments of Literature and of Physical Sciences are found to be approximately the same.

More than 89.9% of the properly-placed of students in Humanities group have aptitudes relevant to other groups. The aptitudes of the properly-placed students in Humanities group relevant to Linguistic & Literature, Engineering and Social Sciences belonging to the departments of Literature are higher than the aptitudes relevant to other groups.

Approximately 90% of the propely-placed students in Social Sciences group have aptitudes relevant to other groups, except for Engineering group by 88.8%. The aptitudes of the properly-placed students in Social Sciences group relevant to Linguistic & Literature, Humanities and Education belonging to the departments of Literature are higher than those to other groups.

Approximately 90.9% of the properly-placed students in Natural Sciences group have aptitudes relevant to other groups. Of these, their aptitudes relevant to Engineering Medical Sciences. Pharmacy and Agriculture & Forestry belonging to the department of Physical Sciences are higher than those to other groups.

More than 91.9% of the properly-placed students in Home Economics group have aptitudes

relevant to other groups, except for Nursing group by 88.4%. The aptitudes of the properly-placed students in Home Economics group relevant to the departments of Literature and of Physical Sciences are found to be approximately the same.

More than 93.2% of the properly-placed students in Engineering group have aptitudes relevant to other groups. The aptitudes of the properly-placed students in Engineering group relevant to Natural Science. Agriculture & Forestry and Pharmacy groups belonging to the department of Physical Sciences are higher than those to other groups.

More than 85.7% of the properly-placed students in Medical Sciences group have aptitudes relevant to other groups. Of these, their aptitudes of the properly-placed students in Medical Sciences group relevant to other groups except for Engineering, Agriculture & Forestry and Marine & Fishery groups are more than 90%. Especially, more than 95.6% of them have more aptitudes that are relevant to Pharmacy and Education groups. The aptitudes of the properly-placed students in Medical Sciences group relevant to the departments of Literature and of Physical Sciences are found to be approximately the same.

More than 85.3% of the properly-placed students in Pharmacy group have aptitudes relevant to other groups. Especially, more than 97.1% of them have aptitudes relevant to Natural Sciences, Engineering, Agriculture & Forestry and Education groups. The large number of properly-placed students in Pharmacy group have more aptitudes relevant to the departments of Physical Sciences than to the department of Literature.

Appoximately 88% of the properly-placed students in Nursing group have aptitudes relevant other groups. The aptitudes of them relevant to other groups except for Engineering, Medical Sciences and Marine & Fishery is more than 96%. Especially, more than 96% of them have aptitudes relevant to Pharmacy and Education groups.

The aptitudes of the properly-placed students in Nursing group relevant to the departments of Literature and of Physical Sciences are found to be approximately the same.

Approximately 86% of the properly-placed students in Agriculture & Forestry group have aptitudes that are relevant to other groups.

More than 90% of them have aptitude relevant to Natural Sciences, Engineering, Medical Sciences. Marine & Fishery and Education groups. The aptitudes of the properly-placed students in Agriculture & Forestry group relevant to the department of Physical Sciences are higher than those to the department of Literature.

More than 95.7% of the properly-placed students in Marine & Fishery group have aptitudes relevant to other groups. Generally, they have high aptitudes relevant not only to their own group but also to other groups.

More than 88.1% of the properly-placed students in Education group have aptitudes relevant to other groups. Especially, more than 90% of them have aptitudes relevant to Social Sciences, Natural Sciences, Pharmacy and Agriculture & Forestry groups belonging to the department of Physical Sciences. The aptitudes of the properly-placed students in Education group relevant to the departments of Physical Sciences are higher than those to the department of Literature.

E. Analysis of the Aptitude Structure of Mis-Placed Students by Group

Even the students who are mis-placed in their own group may have aptitudes that are relevant to other fields of specialization. Table 4—7 shows how many mis-placed students by group have aptitudes that are relevant to other lines of specialization.

More than 83.3% of the mis-placed students in Linguistics & Literature group have aptitudes

<Table 4—7> The level of aptitude of mis-placed students by group(%)

Group \ N	A	B	C	D_1	D_2	E	F_1	F_2	F_3	G	H	I
Group	12	11	31	17	16	38	32	9	3	13	3	45
A		45.5	19.3	39.3	25.0	57.9	34.4	11.1	33.3	16.7	33.3	13.3
B	33.3		9.7	23.5	25.0	52.6	25.0	—	33.3	8.3	33.3	6.7
C	33.3	18.9		17.7	18.8	50.0	28.1	—	—	8.3	33.3	2.2
D_1	50.0	45.5	35.5		25.0	42.1	12.5	11.1	33.3	—	33.3	13.3
D_2									—			
E	83.3	54.6	45.2	23.5	25.0		15.6	67.7	66.7	—	33.3	15.6
F_1	58.3	54.6	29.0	5.9	18.8	39.5		—	66.7	—	33.3	15.6
F_2	66.7	54.6	37.5	17.7	37.5	50.0	25.0		33.3	—	33.3	11.1
F_3					25.0							
G	75.0	81.8	54.8	29.4	50.0	52.6	31.3	66.7	66.7		33.3	24.4
H	66.7	81.8	61.3	52.9	18.8	42.1	31.3	44.4	33.3	33.3		24.4
I	75.0	63.6	67.7	41.2	43.8	65.8	59.3	22.2	66.7	8.3	100.0	

that are relevant to Engineering, Agriculture & Forestry and Education groups. The aptitudes of the mis-placed students in Linguistics & Literature group relevant to the department of Physical Sciences are higher than those to the department of Literature.

More than half of the mis-placed students in Humanities group have aptitudes that are relevant to Agriculture & Forestry, Marine & Fishery, Engineering, Medical Sciences, Pharmacy and Education Groups. The aptitudes of the mis-placed students in Humanities group relevant to the department of Physical Sciences are higher than those to the department of Literature.

More than half of the mis-placed students in Social Sciences group have aptitudes that are relevant to Agriculture & Forestry, Marine & Fishery and Education. But the aptitudes of them relevant to Linguistic & Literature and Humanities similar to the aptitude structure of their own specialization are lower than those to other groups the department of the Physical Sciences.

Most of the mis-placed students in Natural Sciences group have aptitudes that are relevant to other groups, except for Marine & Fishery (52.9%) and Education(41.2%).

Most of the mis-placed students in Home Economics group have low aptitudes that are also relevant to other groups, except for Agriculture & Forestry (50%).

More than half of the mis-placed students in Engineering group have aptitudes that are relevant to other groups. Especially, the aptitudes of them relevant to Linguistic & Literature & Education group are approximately 58%. The aptitudes of the mis-placed students in Engineering group relevant to the departments of Literature and of Physical Sciences are found to be approximately the same.

Most of the mis-placed students in Medical Sciences group have low aptitudes that are also relevant to other groups, except for Education by 59.3%.

More than 66.7% of the mis-placed students in Pharmacy group have aptitudes that are relevant to Engineering and Agriculture & Forestry groups. Especially, no one of them have aptitudes relevant to Humanities, Social Sciences and Medical Sciences of groups. The aptitudes of the mis-placed students in Pharmacy group relevant to the department of Physical Sciences are higher that those to the department of Literature.

The number of the mis-placed students in Nursing group are only 3 persons among the entire students(N=78). All of them have aptitudes relevant to Education group and 2 persons among them have aptitudes relevant to Engineering and Agriculture & Forestry.

Most of the mis-placed studentes in Agriculture & Forestry group have the lowest aptitudes that are also relevant to other groups. The number of the students having the aptituds among them are only 1 or 2 persons the mis-placed students in Agriculture & Foresty group, to groups in the department of Literature.

The number of the mis-placed studentes in Marine & Fishery group are only 3 persons among the entire studentes (N=26). 1 person among them has aptitudes relevant to other groups.

Most of the mis-placed students in Education group have the lowest aptitudes that are also relevant to other groups, 6 or 7 persons among the mis-placed students in Education group have aptitudes relevant to Agriculture & Forestry and Marine and Fishery groups.

The aptitudes of the nis-placed students in Education group relevant to the departments of Literature and of Physical Sciences are found to be approximately the same.

V. CONCLUSION

The conclusions which can be arrived at on the basis of the results identifying the aptitude structures of freshmen and by testing the validity of GIT and DAT used as the criteria of this research, are as follows :

A. The Part of Validation Study

1. The reliability coefficients of the subtests of DAT are acceptably high with the exception of Mechanical aptitude (.594) and Reasoning test (.588). But the reliabilities of these tests are expected to increase, if the items of the tests are re-arranged homogeniously.
2. The medians of the intercorrelation coefficients of the subtests are only. 23, none of them above. 50. Therefore, the each subtest of DAT is believed to have sufficient uniqueness and purity.
3. The concurrent validity coefficients between the subtests and the school subjects of SNU entrance examination and entrance preliminary examination spread within the range of -.21 and .37, and the subtests sharing common knowledge and information with specific subjects show a significantly high correlation at 5% level.
4. The correlation coefficients between the scores of entrance examination and the composite scores combined in accordance with the aptitude structures show a singificant correlation at 1% level on groups. Therefore, it is warranted to conclude that the composite tests have high validity.
5. The multiple correlation coefficients between the subtests and the school subjects of SNU entrance examination and entrance preliminary examination are significantly high in the subjects, Korean Language, English, and Mathematics, and have validity high enough to predict the whole examination scores.

B. The Part of Research Results

1. The freshmen of SNU have a high intellectual ability as compared to the group of Korean college students norm, but tend to obtain the same or lower scores on the tests of psychomotor abilities.
2. Of the freshmen of SNU, more than 85.9% have a significantly high aptitude to the entire groups. The level of aptitude to the department of Literature and Physical Sciences is similar to each other.
3. The number of the properly-placed students by their own groups of freshmen are more than 88.7% on the average and the number of the mis-placed students are only 11.3%. The groups having the greatest number of properly-placed students are Nursing (96.2%), Natural Sciences (93.4%), Engineering (93.3%) and Social Sciences (92.5%). And Medical Sciences has the fewest 73.9%.
4. The departments having the properly-placed students of more than 95% are :
   1) Linguistics & Literature—Chinese Language and Literature
   2) Humanities—Geography
   3) Social Sciences—Diplomatic Science, Political Science, Economic, Law
   4) Natural Sciences—Geology, Applied Chemistry, Applied Mathematics, Physics
   5) Home Economics—Food & Nutrition, Food Engineering

6) Engineering—Mechanical, Material, Resourses, Medical Products, Electrical and Electronic Engneerinig
7) Medical Sciences—nothing
8) Pharmacy—nothing
9) Nursing—Nursing
10) Agriculture and Forestry—Zootechnology
11) Marine and Fishery—nothing
12) Education—Chemistry and English Education

5. The departments having the mis-placed students of more than 20% are :
1) Linguistics and Literature—French Language and Literature
2) Humanities—Oriental history
3) Social Sciences—Education, Social Work
4) Natural Sciences—nothing
5) Home Economics—nothing
6) Engineering—nothing
7) Medical Sciences—Pre-dental course, Veterinary surgery
8) Pharmacy—nothing
9) Nursing—nothing
10) Agriculture and Forestry—Forestry
11) Marine and Fishery—nothing
12) Education—History, Physics, Agricultural and Biology Education

6. The aptitudes relevant to other groups of freshmen by each group appear highly to the fields of specialization having the similar aptitude structures with the fields of their own specialization.

7. Most of the students in Social Sciences, Natural Sciences, Nursing, Agriculture & Forestry and Education groups among fresmen by groups have more aptitudes relevant to their own group than to other groups. But most of the students in Humanities, Home Economics, Marine & Fishery groups have high aptitudes relevant to other group rather than to their own group.

8. Most of the properly-placed students by group also have high aptitude relevant to other group. Especially, they have the highest aptitudes relevant to groups having the similar aptitude structures within the fields of their own specialization.

9. The students of Humanities, Social Sciences, Natural Sciences, Engineering, Home Economics and Marine & Fishery among the properly-placed students by groups have aptitudes relevant to other groups by more than 80%.

10. The students of Natural Sciences, Home Economics, Medical Sciences, Agriculture & Forestry, Marine & Fishery and Education among the mis-placed students relevant to other groups except for above listed group appear largely from zero to 83.3%.

11. The students of Pharmacy and Nursing among the mis-placed students by groups have aptitudes relevant to the groups having the similar aptitude structures with the fields of their own specialization. Especially, the mis-placed students of Linguistics & Literature, Humanities and Social Sciences belonging to the department of Literature have high aptitudes relevant to other groups. Most of the mis-placed of students have more aptitudes relevant to the department of Physical Sciences than to the departments of Literature.

Some issues which can be derived form above conclusions are as follow.

1. The hign school administrators must provide students with a sufficient materials necessary

for selecting colleges and departments, by expanding and reinforcing present guidance program and system.

2. To reduce and minimize the percentage of the mis-placed students at the college level, the methods of classification and placement based on aptitudes must be considered politically at the students selection and transfer programs.
3. To provide the rationale and scientific information necessary for the selection of departments with relation to the individual's academic achievements, the multiple approaches must be adopted, considering sufficiently not only the aptitude of individuals but also the environmental variables and interests of students.

APPENDIX

A. The expectany table for academic achievement

Group / expectancy level		Ling-uistics & Liter-ature	Hu-man-ities	Social Scien-ces	Natu-ral Scien-ces	Home Econo-mics	Engi-neer-ing	Medi-cal Scien-ces	Phar-macy	Nurs-ing	Agri-cultu-re & Fores-try	Edu-cation	Mar-ine & Fishe-ry
Stanine	Verbal Inter-pretation												
9	very high	★69~	69~	69~	69~	67~	70~	67~	69~	64~	70~	69~	68~
8	high	67~68	67~68	67~68	67~68	66	68~69	65~66	67~68	62~63	68~69	67~68	66~67
7	above average	64~66	65~66	65~66	65~66	64~65	66~67	63~64	65~66	60~61	66~67	65~66	64~65
6	a little above average	62~63	63~64	63~64	63~64	62~63	63~65	61~62	63~64	58~59	63~65	63~64	61~63
5	average	59~61	60~62	61~62	60~62	59~61	60~62	58~60	61~62	55~57	60~62	60~62	58~60
4	a little below average	56~58	57~59	58~60	58~59	57~58	57~59	56~57	58~60	53~54	57~59	58~59	55~57
3	a below ave-rage	53~55	54~56	55~57	55~57	54~56	54~56	53~55	55~57	51~52	54~56	55~27	53~54
2	Low	49~52	50~53	51~54	51~54	51~53	51~53	49~52	51~54	49~50	50~53	52~54	49~52
1	very low	~48	~49	~50	~50	~50	~50	~48	~50	~48	~49	~51	~48

★ Composite test scores

B. The table of department classification on group

Linguistics and Literature	Korean Language and Literature
	Chinese Language and Literature
	English 〃 〃
	French 〃 〃
	German 〃 〃
	Japanese 〃 〃
	Russian.
	Spanish.
	Italian.
	Malay.
	Abrabic.
	Portuguese.
	Thai.
	Viet Namese.
	Linguistics.
Humanities	Philosophy
	Buddhism
	Indian Philosophy
	Religion
	Christian study

	Theology
	Biblical literature
	Anthropology
	History
	Geography
Social Sciences	Law
	Political Sciences
	Public administration
	Political and diplomatic science
	Diplomatic science
	Police administration
	Business administration
	Economics
	Business management
	Development of abroad
	International trade
(Continue Social Sciences)	
	Agricultural community development
	Geography
	Library Science
	Journalism & Broadcasting
	Journalism
	City planning sciences
	Psychology
	Education
Nutural Sciences	Mathematics
	Applied mathematics
	Statistics
	Physics
	Applied physics
	Cosmic physics
	Astrometeorology
	Geology
	Physical geography
	Biology
	Botany
	Zoology
	Applied Zoology
	Agrobiology
	Agricultural chemistry
	Chemistry
	Biology chemistry
	Applied chemistry
Home Economics	Food & Nutrition
	Clothing

	Clothing life
	Dietary life
	Home administration
	Housing
	Food processing
	Agricultural home economics
	Food engineering
Engineering	Textile engineering
	Chemical engineering
	Civil engineering
	Architecture engineering
	Electrical engineering
	Mechanical engineering
	Electronic engineering
	Applied electronic engineering
	Metallic engineering
	Atomic engineering
	Ship building engineering
	Ceramic engineering
	Mining engineering
	Industrial management
	Minute articles engineering
	Municipal engineering
	Hygienic engineering
	Communication engineering
	Wireless communication
	Electric wave engineering
	Fuel engineering
	Agricultural engineering
Medical Science	Medical science
	Dentistry
	Veterinary medicine
Pharmacy	Pharmacy
	Herb medicine
	Pharmaceutics
	Agricultural insecticide science
Nursing	Nursing
Agriculture & Forestry	Agriculture
	Farm science
	Agricultural product processing
	Zootechny
	Zootechny product processing
	Dairy science
(Continue Agriculture & Forestry)	
	Forestry

		Horticulture
		Sild textile
		Feeding
Marine and Fishery		Marine
		Fishing
		Marine biology
		Engine
		Navigation
Education		Social education
		Social studies education
		Korean language education
		Foreign languages education
		Audio-visual education
		Science education
		Home education
		Mathematical education
		Industrial education
		Agricultural education
Arts	Music	Music
		Instrumental music
		Composition
		Vocal music
		Piano
		Orchestra
	Fine arts	Painting
		Applied fine arts
		Oriental painting
		Occidental painting
		Drawing
		Embroidery
		Home arts
		Polytechnic
Physical education		Dancing
		Physical dancing
		Health education
Flying		